

### Ebola Virus Disease (Ebola): Synthesis of Guidance for Wastewater Collection and Treatment

*The U.S. Centers for Disease Control and Prevention (CDC) is the lead federal agency for Ebola containment and prevention. Please see the CDC website for the most current recommendations:*  
<http://www.cdc.gov/vhf/ebola/>

#### Ebola Background

Ebola virus is spread person-to-person through direct contact with bodily fluids (such as blood, vomit, diarrhea, urine, sweat, semen, saliva, and breast milk). The incubation period is usually 8-10 days (range 2-21 days). People can transmit the virus while febrile and through later stages of disease, including postmortem. People are not contagious until symptomatic.

- CDC reports that Ebola is not spread through the air or by water.  
<http://www.cdc.gov/vhf/ebola/transmission/index.html>
- CDC has indicated sanitary sewers may be used for the safe disposal of patient waste.  
<http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html>
- Ebola virus is more fragile than many enteric viruses that cause diarrheal disease or hepatitis.
- The envelope that covers Ebola makes it more susceptible to environmental stresses and to chemical germicides than non-enveloped viruses, such as hepatitis A, poliovirus, and norovirus.

#### Ebola and Wastewater

CDC and the World Health Organization (WHO) indicate sanitary sewers can be used for the safe disposal of patient wastes (e.g., feces, urine, vomit, and liquid waste from washing).

<http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html>  
[http://www.who.int/csr/resources/publications/ebola/filovirus\\_infection\\_control/en/](http://www.who.int/csr/resources/publications/ebola/filovirus_infection_control/en/)  
[http://apps.who.int/iris/bitstream/10665/137181/1/WHO\\_EVD\\_WSH\\_14\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/137181/1/WHO_EVD_WSH_14_eng.pdf?ua=1)

In the United States, human waste (i.e., excreta), blood, and other potentially infectious materials are routinely released into sanitary sewers. Wastewater handling processes in the United States are designed to inactivate and remove pathogens, such as Ebola.

Guidelines to prevent exposure to human pathogens, including Ebola virus, when working with untreated wastewater are provided in CDC's Ebola-related guidance on wastewater worker safety titled *Interim Guidance for Workers Handling Untreated Sewage from Ebola Cases in the United States*. The guidance includes recommendations on the types of personal protective equipment (PPE) to be used and proper hygiene for the safe handling of untreated sewage that may contain Ebola virus. The guidance is available at: <http://www.cdc.gov/vhf/ebola/prevention/handling-sewage.html>.

Some workers come in contact with untreated sewage before it enters the wastewater treatment plant. Sewage workers need personal protection when working in sewers.

Worker protection from Ebola begins with:

- Education about what PPE to use to protect broken skin and mucous membranes and proper use, including putting it on and taking it off.
- Routine protocols that ensure workers are protected against potential exposures (i.e., prevent contact with broken skin, eyes, nose or mouth) when handling untreated sewage.
- Good personal hygiene practices, including frequent hand washing to reduce potential exposures to any of the pathogens in sewage.

## Worker Recommendations

CDC guidelines include the following recommended protection of workers handling untreated sewage:

Use Appropriate PPE to protect against contact with human wastes

- Goggles or face shield to protect eyes from splashes of untreated sewage
- Face mask (e.g., surgical mask) to protect nose and mouth from splashes of human waste. If undertaking cleaning processes that generate aerosols, a NIOSH-approved N95 respirator should be used.
- Impermeable or fluid-resistant coveralls to keep untreated sewage off clothing
- Waterproof gloves (such as rubber) to prevent exposure of hands to untreated sewage
- Rubber boots to prevent exposure of feet to untreated sewage

Basic hygiene practices

- Wash skin with soap and water immediately after handling sewage, or any materials that have been in contact with sewage (e.g., immediately following removal of PPE).
- Avoid touching face, mouth, eyes, nose, or open sores and cuts while handling sewage, or any materials that have been in contact with sewage.
- Wash your hands with soap and water before eating or drinking after you have handled sewage.
- Remove soiled work clothes and do not take home to launder. Launder clothing at work or use a uniform service.
- Eat in designated areas away from untreated sewage.
- Do not smoke or chew tobacco or gum while handling human waste or sewage, or any materials that have been in contact with sewage.
- Cover open sores, cuts and wounds with clean, dry bandages.

## Informative Webinar by National Water and Wastewater Organizations

The webcast recording for the November 4, 2014 Water Environment Research Foundation and Water Environment Federation webinar is available at: <http://www.wef.org/EbolaWastewaterConcerns/> and the handouts are at: <http://www.wef.org/EbolaHandouts/>.

## General information

- As part of planning, hospitals should coordinate with the individual sanitation district that serves the hospital.
- Wastewater collection and sanitation districts are encouraged to develop, review and exercise internal programs for risk management and continuity of operations including training and review of personal protective equipment (PPE) inventory.
- The National Institute for Occupational Safety and Health has general Ebola guidance focused on workplace safety and health at [www.cdc.gov/niosh/topics/ebola](http://www.cdc.gov/niosh/topics/ebola).
- The U.S. Occupational Safety & Health Administration recently posted a new guidance about cleaning surfaces that have come in contact with the Ebola virus. The document, *Cleaning and Decontamination of Ebola on Surfaces*, provides guidance on protecting workers in non-healthcare/non-laboratory settings from exposure to Ebola and cleaning and disinfection chemicals. The guidance can be found at [www.osha.gov/SLTC/ebola/control\\_prevention.html](http://www.osha.gov/SLTC/ebola/control_prevention.html). Additional OSHA information is available at: <https://www.osha.gov/SLTC/ebola/additionalinformation.html>.
- The U.S. Environmental Protection Agency (EPA) has developed a list of registered disinfectants that meet the CDC criteria for use against the Ebola virus on hard, non-porous surfaces, available at: <http://www.epa.gov/oppad001/list-l-ebola-virus.html>